CS4203 INTERACTIVE COMPUTATION SYSTEMS (3-2)

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COURSE OBJECTIVES:
* Recognize and describe human factors issues relevant to designing human-computer interfaces
* Understand the relationship between human error and poor design and how to circumvent both
* Understand the trade-offs of training costs versus usability engineering costs
* Design a human-computer interface with an iterative, design/prototype/evaluate development process and apply specific design guidelines as part of this process
* Select appropriate interaction devices and techniques from among alternatives
* Select appropriate dialogue style from among alternatives
* Critique existing or proposed human-computer interfaces using concepts taught in the course

REQUIRED TEXT:
Hix, D. & Hartson, H.R. (1993). Developing User Interfaces: Ensuring Usability Through Product and Process. New York: John Wiley & Sons.

SUPPLEMENTARY TEXTS:
Preece, J. et al. (1994). Human-Computer Interaction. Reading, MA: Addison Wesley.
Newman, W.M. & Lamming, M.G. (1995). Interactive System Design. Reading, MA: Addison-Wesley.
Neilsen, J. (1993). Usability Engineering. Boston: AP Professional.

PREREQUISITES
    CS3300 or consent of instructor.

COURSE CONTENT
Human-Computer Interaction [Preece 1-2; Hix 1; Nielsen 2; Newman 1]
    What is Human-Computer Interaction?
    What is usability?
    Why is usability important?
    What is the value of usability engineering?
Design Methodologies [Preece 17-18; Newman 6]
    User-Centered Design
    Evaluation-Centered Design
    Work (Task)-Centered Design
    Participatory Design
Design Support [Preece 23-28; Hix 2; Neilsen 8-9]
    Design Heuristics [Neilsen 5]
    Guidelines and Standards [Newman 15]
Interaction Styles [Preece 13-16; Hix 3; Nielsen 3; Newman 12]
    Windows, Icons, Mice, Pointing (WIMP)
    Menus, Forms, Boxes
    WWW
    Command languages
    Natural language
    Graphical interfaces (Direct manipulation)
    Others (Virtual Environments, Personal Data Assistants, Multimedia)

Iterative Evaluation-Design Development [Preece 19-22; Hix 4-5; Nielsen 4; Newman 2,4,7]
    Problem statement
    Requirements gathering
    Task analysis
    Conceptual design [Newman 13-14]
    Physical design
Prototyping [Hix 9,11]
    Low-fidelity prototyping
    Rapid Prototyping
    User Interface Management Systems
    GUI Toolkits/Frameworks
Design Evaluation [Preece 29-34; Hix 10; Neilsen 6-7; Newman 5,8-10]
    Why evaluate?
    Usability Specifications
    Observation
    Formative versus Summative Analysis
    Verbal Protocol
    Quantitative/Qualitative Measures
The Human in Man-Machine Systems [Preece 3-10, Newman 3]
    Perception
    Attention and Memory
    Knowledge and Mental Models
    Metaphors
Input/Output Devices [Preece 11-12; Hix 3]
    Input devices
    Output devices
    Matching devices to tasks
Real World HCI
The Future of HCI

LABORATORY AND COURSE ORGANIZATION
This course is largely project-oriented. Grades will be determined based entirely on projects and class participation. Our objective is to complete one full iteration of the design-prototype-analyze development cycle during the duration of this course. Projects A & B are the only projects to be done individually. For all other projects, students will work in groups and will submit a single report. For the prototype and implementation phase, students may use any language in any environment they wish but their choice should fit the task chosen. Students must demonstrate an understanding of usability engineering, evaluation and design methods, and general knowledge of human-computer interaction over the duration of this course and project series.

PROJECT A: A First Look at Usability
PROJECT B: Analysis of an Existing Application
PROJECT 1: Problem Definition
PROJECT 2: Requirements Gathering
PROJECT 3: Design
PROJECT 4: Prototype
PROJECT 5: Usability Analysis
PROJECT 6: Redesign
PROJECT 7: Implementation & Field Test